

ZERO BEAT

HAMPDEN COUNTY RADIO ASSOCIATION, INC.

Springfield, Mass.

ARRL Affiliated, 31st Year

May, 1980

FLEA MARKET

THE HAMPDEN COUNTY RADIO ASS'N
Springfield, Massachusetts

ANNUAL FLEA MARKET

Friday May 2nd 1980

Feeding Hills Congregational Church
Intersection of Routes 57 & 187,
Feeding Hills, Ma.

AMATEUR, CB, AND ELECTRONIC
EQUIPMENT!!!

DOORS OPEN AT 7:00 pm

\$ 3.00 per table

NO JUNK, PLEASE!!!!

For more information:

Andy Bouchard, WB1BZW
(413) 786 2301



ELECTIONS

The nominating committee has been formed to nominate a slate of officers and directors for the 1980-1981 year. Please let Larry, WB1CJH know of your recommendations for officers and directors so that talented and capable people will not be overlooked. The HCRA now numbers over 200 members and it is impossible for the nominating committee to be familiar with the talents and interests of every member. The success of the club in the coming year is directly related to the quality of leadership and your help is very important.

BANQUET

Hampden County Radio Ass'n
Annual Banquet

Friday, May 30, 1980

Feeding Hills Congregation Church

The HCRA banquet will be held the weekend before Memorial Day weekend and promises to be a pleasant evening for all. We have been assured a very generous roast beef dinner with fruit cup, salad and dessert.

Tickets will be available from club officers, the board of directors and at the flea market. Tickets are \$6.50 per person and must be purchased no later than Friday, May 23rd.

You don't have to lie awake nights to succeed—just stay awake days.

HAMPDEN COUNTY RADIO
ASSOCIATION, INC.

PRESIDENT

Larry Soltz WB1CJH 567 3444

VICE PRESIDENT

Ron Beauchemin WB1ETS 593 9852

SECRETARY

Andre Bouchard WB1BZW 786 2301

TREASURER

Paul Kress WALZKT 568 8291

DIRECTORS

Moe Beauchemin	WB1FIP
Jeffery Duquette	KLBE
Al Sittard	WB1EMN
Ollie Passburg	N1AFK
Jack Lo Monaco	WALYYK
Steve Shore	WALZEV
Ray Morin	KALCRG
Jack Dumont	K1ZQB

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Contributor	John Balboni	AC1T
Contributor	Joe Dumais	WB1EMB
Contributor	Bert Snyder	WB1DTZ

To: WALZKT
Editor Zero Beat

On Monday evening the 3ed of March I checked into the first session of the W.M.T.N. along with a couple of other ham's from the area. Art, W1KK was net control that evening. It sure was very interesting and has been so ever since.

It didn't take long to bring my code speed up and to learn quite a few new Q signals, C/w net procedures, and just how to make up messages for the C/W nets.

The W.M.N. follows the training net and I monitored it for quite some time before getting enough nerve to check in.

Bill, W1TM was net control the nite I decided to check in-DE WALYYW QNI QRU K - there I did it! When W1TM came back with - QTC WALYYW 1 - I almost fell out of my chair.

Many weeks have gone by since that first nite. I know I have improved on my code speed and I think I have learned many things that will help me on the C/W nets.

My sincere thanks to the net control stations for their assistance, W1KK, Art; W1BVR, Perce; W1UD, Bill; W1TM, Bill; K1JHC, Tom.

73s Rich, WALYYW

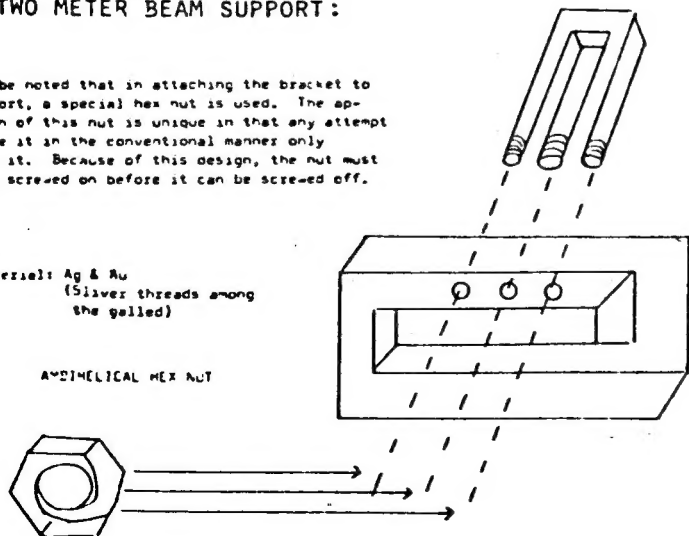
(Ed. note: The net is held Monday thru Friday at 3562 MHz at 6:30 pm.)

TWO METER BEAM SUPPORT:

It will be noted that in attaching the bracket to the support, a special hex nut is used. The application of this nut is unique in that any attempt to remove it in the conventional manner only tightens it. Because of this design, the nut must be fully screwed on before it can be screwed off.

Materials: Ag & Au
(Silver threads among the galled)

ANODIZED HEX NUT



FRANK H KOZAK
LORRAINE KOZAK

"Quick As A Wink"

PRINTING & SALES CO.
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454 MAIN STREET
WEST SPRINGFIELD, MA. 01089

FREE PARKING
AT OUR DOOR

Checking into Slow-Speed Nets

REPRINTED FROM

QST,

DECEMBER, 1976

Tired of being plugged into a code cassette hour after hour? Then check this out.

By Peter Hills,* WØHXB and Robert Halprin,** K1XA

Take it from us, there's a good chance that you'll enjoy handling traffic (messages) more than listening to a code cassette over and over. While sojourning on slow nets, ham radio newcomers (Novices, Technicians and inactive upperclassmen) can QSO savvy cw operators, increase their code speed for those upperclass licenses and learn message-handling procedures. The other part of the equation involves the more experienced types. Their presence serves to introduce the newcomers to one of the public-service aspects of amateur radio as well as brushing up on their own operating skills. We now have more newcomers than ever before, so let's get going!

Most slow-speed traffic (message relaying) nets operate in the 80-meter

Novice band with affiliation with the ARRL National Traffic System. They exist to train hams in proper network operation. We'll try to give you a general explanation of what you might hear on a slow net frequency. Keep in mind most of it is similar to the action on a regular cw net.

Checking In Is Easy!

The net control station (NCS) will call the net at about 10 words-per-minute. In the callup, he'll be using an accepted abbreviation of the net's name:

CWN (Colorado-Wyoming Net) *DE WØHXB QND* (the net is now in session) *pse QNZ* (please zero beat my signal) *CWN DE WØHXB QN1K* (stations wishing to check in, go ahead).

Wait a few minutes before checking in, since there will be an initial rush from the more experienced net members who have traffic to pass. After the busy period slackens, reply to the NCS's callup by simply sending a letter of the alphabet, such as *M*. When the NCS repeats that same letter, it means that he is standing by for you and **YOU ONLY**. He wants you to "Come on down!"

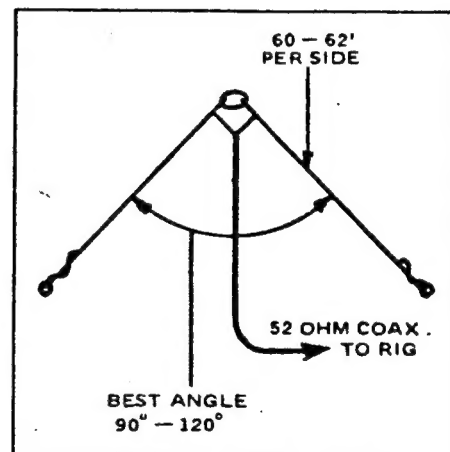
That's your cue. You send *DE WNØWEM QRU* (this is WNØWEM, I don't have any traffic). **YOU DON'T NEED TO SEND THE NCS'S CALL WHEN CHECKING IN.** Keep in mind that it's better to check in at a speed slightly slower than your maximum copying speed. The NCS should respond at your speed. This way you're sure of being able to understand what he's talking about!

WØHXB (the NCS) responds *WNØWEM GE R AS* (good evening, I acknowledge that you have no traffic, please stand by). Later on, he may ask you for your name, QTH and perhaps your street address so you can be added

to the net roster and receive a net bulletin. He will "officially" welcome you to the net and ask you to check in as often as you can.

QRU, QTC, What Have We Here?

Listen to others checking in, the way they conduct themselves on the net, and practice copying the messages being sent. Before long, you'll get to know the procedures, abbreviations and Q signals. One you're sure to hear often is QTC.



A rig that offers break-in, a T-R switch, separate transmitting and receiving antennas, or a transceiver with fast VOX is a real help. While any efficient and resonant antenna will do, an inverted dipole with its center 35 feet or more (the higher, the better) above the ground is probably best and easiest to erect. Such an antenna will operate over all of the 80- and 75-meter cw, Novice and phone bands, with an SWR of less than 3 to 1 and will work very well on less than 250 watts (Novice power limit). Fold the ends back to allow precise adjustment of frequency. Useful (but not necessary) accessories include headphones (to increase concentration), an audio clipper (back-to-back diodes across the audio output to protect eardrums), an audio filter (to cut down on QRM and QRN), an SWR bridge (for antenna adjustments), or an electronic keyer (for precise keying at rapidly and widely variable speeds).



Well-known traffic man and contestor K3UA got his start on training nets.

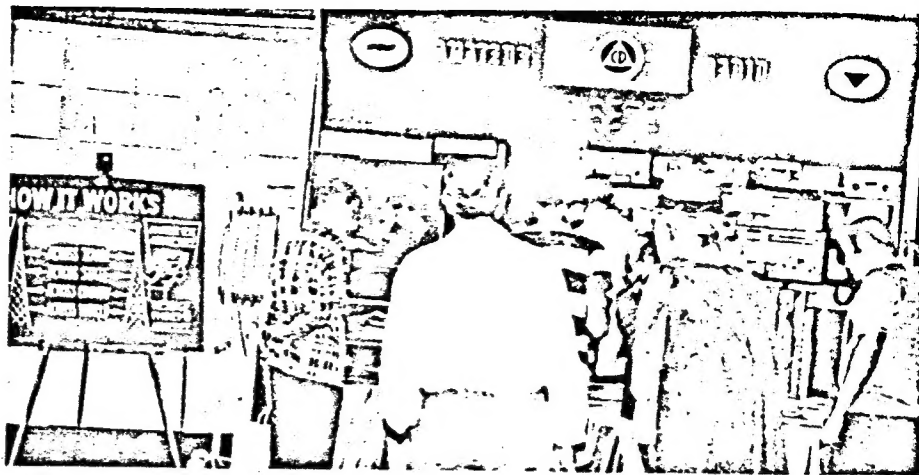
which basically means traffic. For example: *QTC 1 Denver* (I have one message for Denver).

Most of your questions concerning traffic handling will be answered by getting hold of the following ARRL operating aids (available for a large-size s.a.s.e.): *Operating an Amateur Radio Station*, *Public Service Communications*, and CD forms 3 and 218. The meeting times and frequencies of traffic nets can be found in the *ARRL Net Directory*. Get out your back copies of *QST* and read "A Beginner's Guide to Traffic Handling," July, 1976, *QST*, page 58. Don't forget the brand new *ARRL Ham Radio Operating Guide*, while you're at it.

The typical slow net will run about a half hour. Eventually you will be excused. The NCS will call you by sending the suffix of your call: *WEM*. You then send something to indicate that you're listening, such as a dot or a dash, or *K* or *HR* (here), or *C* (yes). The NCS will send *QRU QNX* (we have no traffic for your area, you are free to leave), *TNX QNI* (thanks for checking in), etc. If necessary, you can ask the NCS to excuse you early; *QNX?* However, never leave the net without the NCS's permission.

You have a choice of methods of signing out: *W0HXB DE W0WEM GE* or *CWN DE W0WEM GE*. To save time, the NCS may excuse everyone at once: *QNC* (everyone copy) *CWN QRU QNX TU GE CWN DE W0HXB QNF* (the net is over). Then individual stations take turns closing. Remember, you do not need to identify (your call sign) each time on brief exchanges, but only when you *QNI*, *QNX* and every ten minutes during lengthy transmissions.

As you get more experienced and confident, you will start handling some messages. Most of the traffic will be handled off frequency. The NCS will send you and another station to a



The general public is quite fascinated with our free message-handling capability, as evidenced by the crowd around this booth at the Ohio State Fair.

specific frequency: *W0WEM K0TER up 3 Denver* (*W0WEM* and *K0TER* *QSY* up three kHz and pass one message for Denver). Do something with your key to signify that you heard and you're moving. The *RECEIVING* station always calls the station who has the traffic. Most likely, you won't be asked to handle traffic until you've checked in a few times. Your first message may be a formal welcome from the net manager. Regardless, don't get nervous. Make contact with the station on the specific frequency. He will ask you if you are *QRV* (ready to copy). Answer yes, if you have a clean sheet of paper and a crayon in front of you. You may want to have your ARRL operating aids handy as well.

If you missed some things and need fills (repeats) don't hesitate to ask for them. For example, in the sample message, if you missed Pete Hills' call sign, you would ask: *WA Hills* (word after Hills). If you missed the number on Hudson Street, you might ask for *WB Hudson* (word before Hudson), so on and so forth. When you have it all

down, you will be able to *QSL* the message with a clear conscience!

Remember, efficiency of receiving, not wild code speeds, is most important in traffic nets. When you're the one transmitting the message, there is no need to repeat anything unless it is a very unusual word or you are asked to repeat. You should also keep your calls short.

Regular participation will earn you a net certificate. Before long, you will be able to originate and deliver messages for your community and assist in emergencies. You will probably want to get your ARRL OTS (official traffic station) appointment from your Section Communications Manager (see page 8, *QST*). The SCM can also provide information about nets in your section.

It won't take long for you to find that traffic handling is an exciting way to bring up your code speed and that it's fun to hang out with experienced operators. Your specific questions can be answered by the NCS or net manager, *AFTER* the net. We look forward to meeting you on the air soon. **QST**

A list of nets that operate in the Novice frequency spectrum appears on the following page.



WN6CZV seems to be enjoying the peaceful coexistence with the patrons of the Novice frequencies, of which traffic handlers are the cream of the crop.

Sample Message

27 R K0TER ARL17 COLO SPRINGS CO JUN 9

PETE HILLS W0HXB
2048 HUDSON ST
DENVER CO 80207
TEL 979 7423

AA
AA
AA
BT

End of first
adr lines

See CD Form 3
for ARL texts

WELCOME TO CWN X WE
NEED YOUR HELP AND HOPE
YOU COME OFTEN X ARL
FIFTEEN 73

BT

Before and
after text

MIKE

AR

End of msg

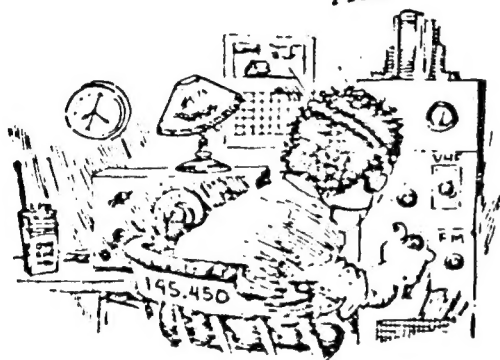
From: W0QOT 6/9 0200z
To: W0HXB 6/9 0500z

Note for
your files

Note in the sample message that *Xs* are used instead of periods and *NO* punctuation is used. It is *Number 27* and the *Routine* text has *17* words in it, including an *ARL* text. (*ARL FIFTEEN* - Advise if you need help.)

The following information about a very interesting repeater system has been provided through the courtesy of Rich Gugger, WB2IXE, and the Metroplex Repeater Association. Your editor learned of this very unusual repeater system during a 2 meter QSO with Rich last winter and we hope you find it as interesting as we did:

Metroplex
Box 237,
Leonie, New Jersey 07605.
201/592-1579
Amateur
Communications
Association



Metroplex.

Thank you for your interest in Metroplex. We hope the enclosed information package contains the answers to most of your questions.

Enjoy reading the material, talk with us on the repeater system and join us at our Club meetings or social gatherings. All of our Club functions are open to everyone, licensed or not. So please feel free to bring your friends or guests to our activities.

We look forward to having you as a member of our Association.

How it started.

The name Metroplex, the philosophy of the Club and the concepts for the repeater system were conceived in January, 1978 by Burt (K2KLN) and Alex (WB2MGB).

- The plan was: to establish repeaters on all allocated FCC frequencies utilizing state of the art equipment and technology; to expand the system to include all currently available modes of transmission including FM, SSB, RTTY, and FSTV; to provide a forum on the air as well as at the Club meetings for all radio amateurs; to provide emergency communication services; to avoid competition with any other repeaters, modes, clubs or concepts; to make the system as open as possible; to ask for support only in terms of membership on a voluntary basis to maintain the

expanding operations; to create an amateur license teaching series on color videotape for presentation on the TV repeater; and to stimulate activity on relatively unused amateur frequencies by cross-linking repeaters from band to band.

The Metroplex organization.

There are 12 meetings per year on the second Wednesday of each month, at 8:00 P.M., in Firehouse No. 4, Fort Lee, New Jersey. The meetings are open to members and non-members alike.

The Club also sponsors 3 social affairs during the year: a gourmet picnic in July; a fall outing in October; and a Christmas party in December. On-the-air activities include a Swap Net every Thursday night at 9:00 P.M. and code practice sessions soon to be simulcast on all the repeaters.

How to join.

Everyone is welcome to use the Metroplex system. Membership in Metroplex is open and encouraged. The cross-link to 10 meters and the autopatch privileges are reserved for Club members.

A membership application is supplied with this information package. Just fill it in and mail to the Club P.O. Box, or you can join in person at any Club meeting. Attendance at Club meetings is not a requirement for membership.

If you are located more than 100 miles from New York City you can join Metroplex International at a reduced rate and still enjoy all Club privileges. If you are under 18 the membership fee is lower without reduction in Club privileges.

Metroplex International Ltd.

To take advantage of the 10 meter and 6 meter long distance repeaters and the 2 meter band openings, Metroplex has members and users throughout the United States and the rest of the world. The dues for Metroplex International are \$7.00 per year and entitle the member to all Club privileges. Metroplex International is available to stations located more than 100 miles from New York City. We are expecting considerable activity in the International Division with the introduction of autopatch and SSB on 10 and 6 meters.

The technical side.

At this time the repeater systems are located in New York City and North Bergen, New Jersey. Additional repeater sites are under construction and will substantially increase the coverage areas.

The 2 meter transmitter and receiver are located in the Washington Heights section of New York City, just south of the George Washington Bridge. The repeater is carrier-access with fully computerized autopatch facilities.

All the Metroplex frequencies have been coordinated by the Tri State Amateur Repeater Council (T-SARC) and authorized by the FCC. Due to the wide area coverage of

the 2 meter repeater in New York, New Jersey, Long Island and Connecticut areas, T-SARC has not coordinated a co-channel for these frequencies.

The 2 meter antenna is a four bay, 6.2 db gain, omnidirectional, vertically polarized array. The transmission line is $\frac{7}{8}$ " nitrogen pressurized Heliax. The antenna is 560 feet above sea level and the ERP is 260 watts.

The Metroplex 10 meter FM repeater operates from dual sites and is heard all over the world. The receiving facility is located in North Bergen, New Jersey. The signals are relayed to New York City where the 10 meter transmitter is located. The antennas are vertically polarized, 560 feet above sea level and produce an ERP of 100 watts. The 10 meter repeater is cross-linked to the 2 meter repeater so that 2 meter operators can take advantage of 10 meter DX conditions.

The Metroplex 440 repeater, located in New York City, is also an open machine but requires 4A or 5Z tone for access. The repeater runs 600 watts ERP utilizing a 10 db gain Phelps Dodge Super Stationmaster antenna fed with nitrogen pressurized $\frac{7}{8}$ " Heliax transmission line and is located 565 feet above sea level.

All the Metroplex repeaters are set up on an emergency generated power system, stay on 24 hours a day and are equipped with 2:00 minute time-out timers.

Metroplex autopatches.

The Metroplex autopatches are completely computerized and are the most sophisticated in the United States. When you make a call you are actually dialing all the information into the computer. The computer verifies your account number and the number you dialed for accuracy. The computer then selects the least expensive circuit for the call by inspecting the first six digits of the number dialed, and redials the information into the outgoing circuit.

This is part of a very large long-distance network containing local trunks, foreign exchange lines, WATS lines, and microwave communications channels. The computer also keeps all the records so that each Club member receives a printout at the end of each month. This system provides the lowest rate and best quality, regardless of the destination of the autopatch call.

Personal speed numbers and emergency police speed numbers to all departments in the Tri State area are supplied to each member. No limit is placed on either the length or distance of an autopatch call. Personal calls are paid for out of the autopatch pool and emergency speed calls are paid for by the Club.

Operating on the

Metroplex repeater system

Metroplex has established a friendly and mutually informative relationship with the FCC in Washington and New York, and they provide us with invaluable assistance on all Metroplex projects.

The Trustee of the repeaters, whose call sign appears on the identifiers, is responsible for the content of all transmissions conducted via the repeaters. The Club rules are set up to protect the system, the licenses, the members and the Trustee.

Here are some of the carefully prepared operating practices which, we have found, make life on the Metroplex system more efficient, enjoyable and legal:

- There are no mobile hours on Metroplex. Instead, during periods of high activity, stations are expected to limit the length of their individual transmissions. The busier the repeater, the shorter the transmissions should be.
- Try not to say "Call Please" during an exchange of important information or someone giving directions.
- To enter an existing conversation, just give your call and you will be put in rotation.
- To make a call, say "Call Please" and identify your station. You will then be recognized promptly.
- Please leave 3-second pauses for courtesy, and to prevent stacking the 2 minute time-out timer.
- DO NOT RECOGNIZE A JAMMER IN ANY WAY, even with a short comment or in code! They also know the code and will persist with their interference.
- Identify with your own call *only* every 10 minutes. Let the repeater's ID be your guide.
- AVOID ALL DISCUSSIONS ON THE AIR ABOUT PLs. Always use the Club phone number to get the answers to any questions about autopatch, PLs or codes.
- Avoid handling third party traffic except on the autopatch, which provides proper logging.
- Avoid negative discussions about the FCC, other repeater groups or other radio amateurs!

If you have any questions or would like additional information about Metroplex, please call the Club phone number, or write to the Club P.O. Box.

Enjoy our repeaters and try to attend one of our meetings or social functions.

FOR SALE

Wilson MARK II XCVR.
With T.T.Pad, 2 antennas, belt-case speaker-mic, charger, mobile charger, six local freq. pairs.

Excellent condition, 1½ years old. Best offer.

Don, WB1BZG, 561 1033

CONGRATULATIONS

Gent Lam, WAlCQF, has been awarded

W A S

OPINION BY J. J. DUQUETTE, K1BE

The ARRL will soon be polling amateurs in regards to long range planning for our hobby. I think we should share ideas in our newsletter and form a consensus of opinions. The following are food for thought and are my own, they represent no official club policy or idea.

The dinosaur of ham radio, cw or morse code, is under attack. It will become extinct as present frequency allocations are compressed to make room for voice communications. We should NOT allow this to happen! High speed cw operators are the creme-de-la-creme of amateur society. They are declining in numbers and status due to old age, repeaters, CB-ers, and a why-use-code-when-voice-is-available mentality. Therefore, the league should plan to intensify its' recognition and encouragement of high speed code operators. Perhaps this could include intensive code tapes that the affiliated clubs could run programs with. The tapes could go from 18 to 30 wpm, with verbal encouragement, and traffic handling procedures also included. (The Western Mass. Training Net and Western Mass. Net fulfill some of this in our section.)

We are expected to fulfill the basic tenets of ham radio's existence. One of these is to "expand the reservoir of trained radio operators". Therefore, I propose the league begin to intensify through QST, affiliated club programs, and FCC test requirements, training and technical skill levels of all amateurs. (especially in solid-state!) New ideas about modes and electronics should be widely experimented with, and no red-tape holding them back. In-depth knowledge should be stressed more. Satellite technology should be catapulted to the forefront. Left alone, we'll have thousands of "appliance operators" using satellite repeaters giving as much thought to the technological miracle as they now do to mountain-top repeaters. (. . . Gee wiz, the machine's down again, oh heck, over to .10/.70 instead! . . .) CB will be replaced by the new system of satellite telephone-radios that will be available to everyone by 1985. CB will be a big zero, and so will amateur radio FOR THE PEOPLE WHO ONLY WANT TO TALK! We should plan on running our own technological miracles and continuing to attract the electrical/mechanical types.

The use of HF frequencies will continue to be deserted by other users, as they switch to space. A problem which will get worse if left in its' present state of limbo is that of the illegal who borrows a call or just buys the transceiver. Therefore, I propose the ARRL begin serious efforts to force FCC to enforce the rules, and begin a series of articles on direction finding in QST. This should include techniques, equipment, and programs that individuals or affiliated club can put into service. The hams will have to clean out their own garbage, the FCC is incapable of it. I propose re-instituting license fees to be used for enforcement of the regulations.

As we gallop along, and our dollar shrinks, while better equipment costs climb out of site, a "modest" station may be impossible to own individually. (Remember when you could own your own house without your wife and children working?) Therefore, I propose the league, via QST,

publish articles on the legal ins-and-outs of owning a group station. Many people own boats and airplanes jointly, so why not ham radios? But there are legal hassles that should be planned for, otherwise when the "airplane" crashes, who owes what?

The military takes about 2½ years to train adequate electronic repairmen. The next war will be electronic and last less than four months. Amateur radio will have to supply electronic technicians and radiomen in unprecedented numbers. Our electronic wizardry will decide who'll win the conflict. Therefore, I propose that the ARRL identify, encourage, and find outside (of the league) sources for educational financing for the 12 year old "Tom Swift" genius-types in the ham fraternity. The people who'll develop Electronic Counter Measures (ECM) and Electronic Counter-Counter Measures (ECCM) in modern warfare start at a very early age to learn what they must know! Imagine if the United States had the ability to assume radio control of any guided missile. More and more small and politically unstable countries are developing atomic weapons. Would they try to launch a missile if we could assume control via radio, and return it to its' launching pad?

The tin can developed because Napoleon had to have a way to preserve food for his soldiers. There was a definite need but it wasn't met until Napoleon offered \$50,000 for the best idea! Let's start to identify our country's needs that amateurs can help with. Ideas blossom, and our club might stimulate the ARRL. These vast creative resources lying untapped must be set to work. The ARRL is the catalyst to initiate all that brain power. Alternate energy sources, greater technical abilities, new modes of communications, innovative satellite uses, all will burst forth with the right leadership!

FIELD DAY

Field Day, June 28 and 29, is rapidly approaching and the HCRA will gather at Camp Barber in West Granville, Mass. for the occasion. Camp Barber sounds great for the big event and maybe your XYL and kiddies will enjoy this one.

The camp has a large area for camping, a large building, a large kitchen, hot and cold running water. Two ponds for fishing, 20 miles of hiking trails, trails for motorcycles and no neighbors.

Plans are forming for this annual event which is a combination technical and social weekend for the HCRA.

"Band Captains" have been appointed and you are encouraged to let one or all of the "band captains" know if he has your support and help at anytime throughout the weekend, day or night, in keeping the activities going. Only licensed amateurs may operate because of potential international third party restrictions but would be amateurs can provide a great deal of help in logging. It is also a great opportunity to learn.

Band Captains

80 meters	Art, W1KK Jhon, AC1T
40 meters	Andy, WB1BZW
20 meters	Jeff, K1BE
15 meters	Al, WB1EMN Ron, WB1ETS
10 meters	Paul, WA1ZKT

Everyone is invited. The Club will provide the location, each will bring their own food and refreshments. A map will be provided in the next issue.

Advice to gardeners: The easiest way to tell your plants from weeds is to pull up everything. Whatever come up again are weeds.

The preponderance of synthesized equipment in operation on two meters today has resulted in much out-of-band operation. This is very easy to do, especially if you must QSY while driving: (For example: 147.51 simplex dialed in with the offset control in the +600 position will put you out of the band). You might also end up putting an FM signal on those portions of the band where other emissions are used. For help in staying within the proper band, or sub-band, here is the current U.S. Two Meter Band Plan:

144.0 -144.1	A1 emissions only
144.1 -144.5	Weak signal operation (non-FM)
144.5 -144.6	Linear Translator inputs (NO FM!!)
144.61-144.89	Repeater inputs
144.9 -145.1	Non-channelized simplex operation
145.1 -145.2	Linear Translator outputs
145.21-145.49	Repeater outputs
145.8 -146.0	OSCAR sub-band
146.01-146.37	Repeater inputs
146.40-146.46	Repeater and Simplex operation
146.49-146.58	Simplex operation
146.61-147.39	Repeater operation
147.42-147.57	Simplex operation
147.60-147.99	Repeater operation

The following items may be obtained for \$2.05 from the U.S. Gov't. Printing office, Superintendent of Documents, Washington, D.C. 20402.

Part 97-FCC Rules & Regulations for the Amateur Radio Service—Jan., 1979. Stock Number 004-000-00357-8.

Part 99—FCC Disaster Communications Service Rules & Regulations, April 1976. Stock Number 004-000-00326-8/Catalog No. CC17:99

The new edition of *ARRL Net Directory* is now available.

Listing over 800 public service nets by location and frequency, this newly revised booklet is also packed with information on all the in's and out's of traffic handling and net operation. You may obtain a copy by sending a self-addressed 9 x 12-inch envelope with 41 cents U.S. postage to ARRL Net Directory, 225 Main St., Newington, CT 06111.

Murphy's law for Amateur Radio

- An important instruction manual or operating manual will have been discarded.

- Original drawings will be mangled in the copying machine.

- Any wire cut to length will be too short.

- Identical units tested under identical conditions will not be identical in the field.

- The availability of a component is inversely proportional to the need for that component.

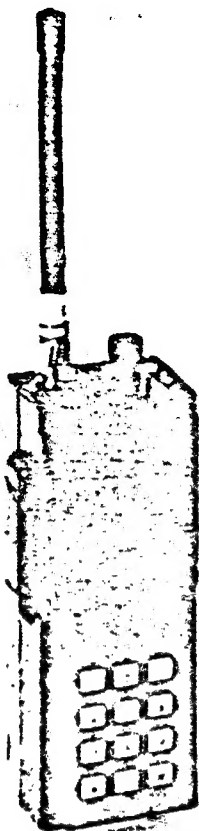
- If a project requires X components, there will be X - 1 in the junk box.

- If a particular resistance is needed, that value will not be available. Further, it cannot be developed with any available series or parallel combination.

- A dropped tool will land where it can do the most damage. (Also known as the law of selective gravitation.)

- A device selected at random from a group having 99% reliability, will be a member of the 1% group.

- The probability of a component value being omitted from a plan or drawing is directly proportional to its importance.



- Interchangeable parts won't.
- Components that must not and cannot be assembled improperly will be.

- If a circuit cannot fail, it will.

- A fail-safe circuit will destroy others.

- A transistor protected by a fast-acting fuse will protect the fuse by blowing first.

- A self-starting oscillator won't.

- A crystal oscillator will oscillate at the wrong frequency — if it oscillates.

- A PNP transistor will be an NPN.

- A failure will not appear till a unit has passed final inspection.

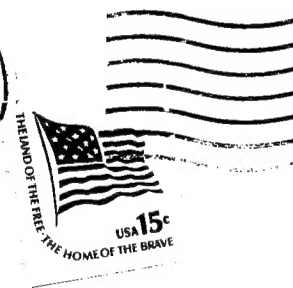
- If an obviously defective component is replaced in an instrument with an intermittent fault, the fault will reappear after the instrument is returned to service.

- After the last of the 16 mounting screws has been removed from an access cover, it will be discovered that the wrong access cover has been removed.

- After an access cover has been secured by 16 hold-down screws, it will be discovered that the gasket has been omitted.

- After a rig has been fully assembled, extra components will be found on the bench.

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